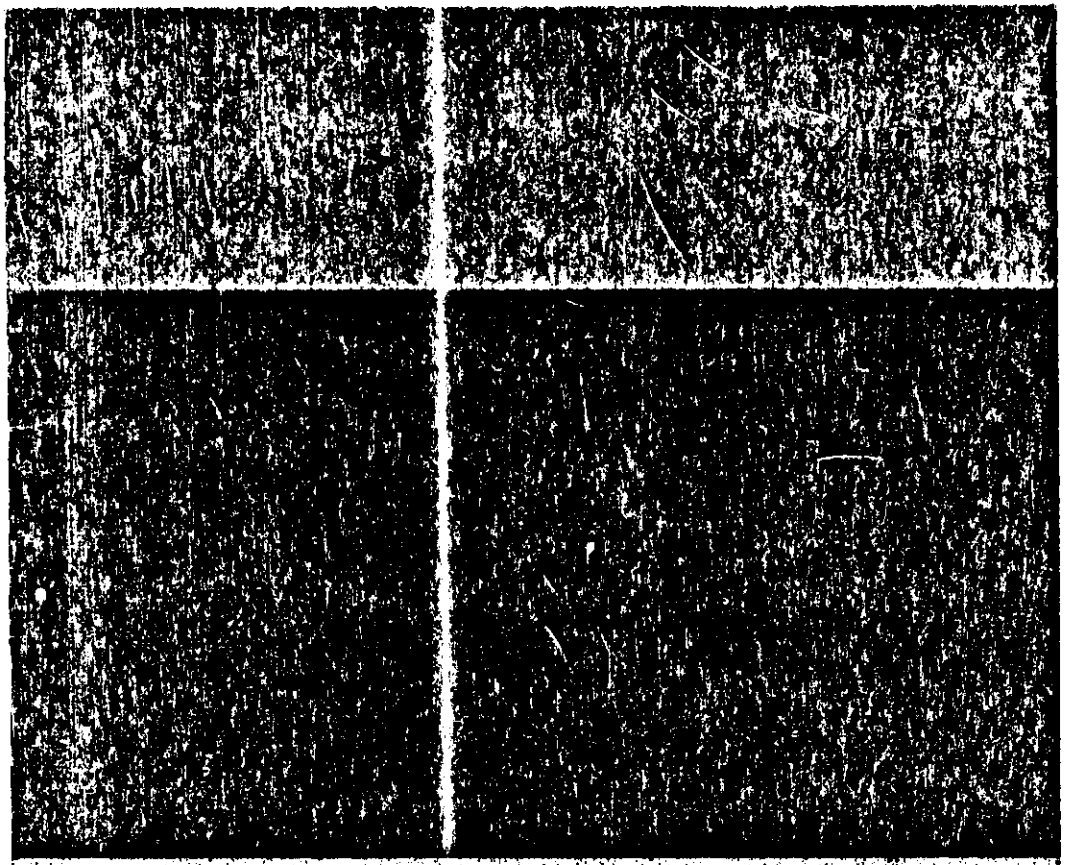
Soft Seventy



Synergistic Software

Soft Seventy

by Gene Hite

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QUICK REFERENCE COMMAND SUMMARY

Keyboard Commands

EDITING FEATURES
These features emulate those of the Autostart ROM.

Esc A	Move cursor right one space (non-recursive)
Esc B	Move cursor left one space (non-recursive)
Esc C	Move cursor down one line (non-recursive)
Esc D	Move cursor up one line (non-recursive)
Esc E	Clear to end of line
Esc F	Clear to end of text window
Esc I	Move cursor up one line (recursive)
Esc J	Move cursor left one space (recursive)
Esc K	Move cursor right one space (recursive)
Esc M	Move cursor down one line (recursive)
Esc @	Clear text window, home cursor

ADDITIONAL FEATURES

Esc G	Toggle font (two fonts provided)
Esc H	Invert entire text window; Toggle inverse mode
Esc L	Toggle case (upper and lower)
Esc N	Toggle inverse/normal mode (Flash is not available)
Esc O	Toggle overstrike mode
Esc P	Toggle Hi-Res page
Esc Q	Quit. Resets to 40 column text screen and warm starts current language.

Commands in a Program

PRINT CHR$(1)"X"	where X is the letter A-P as above. Do not use QUIT command from within a program. From INTEGER BASIC use the INTEGER CHR$ function provided.

POKES and CALLS

CALL 38144 (-27392)	Soft Seventy Cold Start — Clears screen
CALL 38147 (-27389)	Soft Seventy Warm Start — Does not clear screen
CALL 38150 (-27386)	SCREENREAD — POKEs character at cursor to 71
CALL 38153 (-27383)	HOME — Clear screen and home cursor
CALL 38156 (-27380)	INTEGER CHR$ — Prints character at location 71
CALL 38173 (-27363)	Unlink Soft Seventy, revert to normal screen

POKE 9, COL-1	Set horizontal cursor position to column COL
POKE 38168,32 (POKE -27367,32)	Set Soft Seventy to write to page 1
POKE 38168,64 (POKE -27367,64)	Set Soft Seventy to write to page 2
POKE 38171,W (POKE -27365,W)	Set number of columns (W = 0 - 70).

SOFT SEVENTY
Seventy Columns Without Hardware

I. INTRODUCTION

The SOFT SEVENTY utility program is an easy to use package which must be used in conjunction with your own programs. Minor program modifications will be needed to take best advantage of this utility.

The APPLE][computer has many strengths and few weaknesses. However, many users wish more text could be entered onto the APPLE][‘s display screen. Standard typewritten pages range from 60-66 characters width for PICA type and from 70-80 characters width for ELITE type. The APPLE][screen supports only 40 columns. Why? Because the designers of the APPLE][wanted users to be able to use standard TV sets as output devices. The horizontal resolution of a normal TV is not sufficient to display more than about 40 columns of 7x8 dot matrix characters.

Various hardware suppliers are producing 80 column circuit boards for the APPLE][. These use one of the APPLE][Bus slots and require a monitor-grade CRT display. In general, they are quite satisfactory. The only drawback is price — usually between $250 and $375.

Enter SOFT SEVENTY. SOFT SEVENTY uses the APPLE][‘s Hi-Res screens to produce a 70 column display of 4x8 dot matrix characters. This takes full advantage of the APPLE][‘s powerful graphics capability to create a display similar in function to those of the 80 column boards at a fraction of the cost.

VIDEO REQUIREMENTS: SOFT SEVENTY will produce best results on a black and white video monitor. However, it is usable with a standard black and white TV also, so long as the RF adapter used and the TV itself are well-tuned. In general, if a 40-column display is clear and crisp, the SOFT SEVENTY display will be easily readable. Conversely, any fuzziness on the 40-column displays will look worse on a 70 column display. (Many APPLE][users use standard TV’s which have been modified to accept the APPLE][‘s video output directly. When the TV is in excellent condition, this can provide results with SOFT SEVENTY almost as good as with monitor-grade CRT displays.)

Use of SOFT SEVENTY with color TV’s or color monitors will produce difficult to read displays, and is not recommended.

MEMORY REQUIREMENTS: SOFT SEVENTY works only on APPLE][‘s configured with 48K RAM.

II. OVERVIEW

SOFT SEVENTY is a complete package for generating a seventy column screen, as compared to the forty columns normally available from the APPLE][Monitor ROMs. It contains a full upper and lower case 96 character ASCII character set, plus an additional 96 character graphics character set. Either of these character sets may be redefined by the user. The SOFT SEVENTY diskette contains a number of programs and utilities, as listed in Appendix IV. These programs will be described in the following text.

SOFT SEVENTY uses the standard Hi-Res screens ($2000-$3FFF and $4000-$5FFF) for display; therefore, writing text directly onto Hi-Res displays is possible. To the maximum extent possible, SOFT SEVENTY operates just like the standard text screen, so it is very easy to use. In addition, SOFT SEVENTY includes several useful display generation enhancements, including direct entry and display of lower case characters.

SOFT SEVENTY may be used with any Integer, Applesoft, or machine language program which uses the normal APPLE][I/O hooks. Connecting and disconnecting SOFT SEVENTY is simple and straightforward.

Throughout this document, POKE and CALL addresses apply to Applesoft programs, while those for Integer Basic will be shown in parentheses immediately after.

III. GETTING SOFT SEVENTY UP AND RUNNING

When the SOFT SEVENTY diskette is booted, a catalog will be displayed, and you will be offered the option of running any of the three demo programs listed, or simply BRUNning SOFT SEVENTY itself.

BRUNning the SOFT SEVENTY program supplied on the diskette will activate SOFT SEVENTY and immediately enable the 70 column display. Any BASIC program present is lost during this process, so BRUN SOFT SEVENTY before loading the BASIC program. Once SOFT SEVENTY is activated, it remains intact until the next disk boot, or until the APPLE][is turned off. FP and INT commands perform their normal functions without harming SOFT SEVENTY.

You may never need to know where SOFT SEVENTY resides, but, in case you are curious, the SOFT SEVENTY program locates itself above the DOS buffers, and moves the buffers downward, changing the DOS HIMEM default in the process. This location is well protected from being overwritten by BASIC programs and data. This is the same scheme used by Neil Konzen's famous PROGRAM LINE EDITOR (PLE).

Because SOFT SEVENTY resides in the same territory as PLE, these programs cannot be operated simultaneously. This same incompatability exists for any other program which locates above the DOS buffers. (PLE writes directly to the Lo-Res TEXT screen, so PLE and SOFT SEVENTY wouldn't talk to each other anyway.)

It may be desireable to activate SOFT SEVENTY, turn it off, and turn it back on at a later time. This is easy to do. To turn off SOFT SEVENTY from the keyboard, just type the sequence "ESC Q" (don't type the quote marks). From within a program, CALL 38173 (CALL -27363 from Integer Basic). To reconnect SOFT SEVENTY, CALL 38144 (-27392), which also clears the Hi-Res screen. To reconnect without clearing the Hi-Res screen, CALL 38147 (-27389) or press RESET.

IV. SOFT SEVENTY FEATURES

SOFT SEVENTY provides all the editing features of the Autostart ROM (even in machines using the old Monitor ROM). In addition, several new features are offered. All SOFT SEVENTY special functions are accessed from the keyboard via ESC-X sequences, where X is a letter between A and Q. Within programs, special functions are available by printing CHR$(1)"X," where X is a letter between A and Q. (In Integer Basic, a simulated CHR$ function is provided — this will be explained shortly.)

For detailed information about the Apple][Monitor and the Autostart Monitor features that SOFT SEVENTY emulates, the reader should refer to the Apple][Reference Manual.

Editing Features
These features emulate those of the Autostart ROM.

Esc A Move cursor right one space (non-recursive)
Esc B Move cursor left one space (non-recursive)
Esc C Move cursor down one line (non-recursive)
Esc D Move cursor up one line (non-recursive)
Esc E Clear to end of line
Esc F Clear to end of text window
Esc I Move cursor up one line (recursive)
Esc J Move cursor left one space (recursive)
Esc K Move cursor right one space (recursive)
Esc M Move cursor down one line (recursive)
Esc @ Clear text window, home cursor

Additional Features

Esc G Toggle font (two fonts provided)
Esc H Invert entire text window; Toggle inverse mode
Esc L Toggle case (upper and lower)
Esc N Toggle inverse/normal mode (Flash is not available)
Esc O Toggle overstrike mode
Esc P Toggle Hi-Res page
Esc Q Quit. Resets to 40 column text screen and warm starts current language.

Notes on Additional Features

ALTERNATE FONTS — Two alternate fonts share space in SOFT SEVENTY. The first font is an ASCII character set; the second font is a 96 character graphics set. To see both fonts, run the PRINT CHARACTER SET program provided on the diskette. Either font can be changed by the user by means of any standard font generation program such as HIGHER TEXT available from Synergistic Software. Use only the left-hand four bits in each character. Any two such fonts can be merged into the correct format for use with SOFT SEVENTY by means of the FONT MERGE program provided. For more information on the configuration of the SOFT SEVENTY fonts, refer to Appendix II. Other, external, font pairs may be used by SOFT SEVENTY. Simply change the Font Pointer ($9516-9517) to the address of the other font (low byte first).

INVERTING THE TEXT WINDOW also toggles inverse/normal mode. However, the clear to end of line routine, which is used whenever a carriage return is entered from the keyboard, always fills the remaining line with non-inverted blanks. This is the standard Apple protocol. In practice, the user will probably find it easiest to do the screen inversion after all the screen is complete, rather than build a screen in inverse mode. Note that inverting the screen is a toggle operation — re-inverting will simply revert to the previous display, unless writing has been done since the inversion. This feature can be used to make eye-catching screen displays.

UPPER AND LOWER CASE are both provided. SOFT SEVENTY comes up in upper case only mode. In this mode, the standard Apple keyboard convention is in operation. ESC-L toggles to lower case. In this mode, the shift-M ([), shift-N (^), and shift-P (@) are not available — these show up as upper case M, N, and P, respectively. Simply toggle back to upper case mode to access these special characters. SOFT SEVENTY reverts to upper case whenever a RETURN is typed from the keyboard. Printing a carriage return does not cause reversion to upper case.

Standard typewriter shift operation can easily be implemented in lower case mode. However, operation requires a hardware modification to sense the shift key. Any hardware modification which enables sensing the shift key position (such as with one of the APPLE]['s game paddle inputs) can be used, with small additions to SOFT SEVENTY coding. Space has been left for exactly this purpose. The required machine code resides at $9960, as shown below. As supplied, this area is filled with NOP's — 9960:EA EA EA EA EA EA EA EA.


```
$9960   AD  63  C0   LDA $C063   ;CHANGE THIS TO PROPER
                                 ;INPUT ADDRESS OF THE
                                 ;SENSE WORD DESIRED

$9963   29  80       AND #$80    ;BIT MASK. CHANGE TO
                                 ;ALLOW ONLY THE
                                 ;BIT REQUIRED

$9965   F0  04       BEQ  +4     ;CHANGE TO BNE (D0 04)
                                 ;IF SHIFT WORKS
                                 ;BACKWARDS
```

TOGGLE INVERSE/NORMAL works exactly like the control-I and control-N commands in the Apple's Monitor, except that the same control sequence (ESC-N) is used to toggle back and forth. Note that only directly printed material is inverted; entries are not. This is consistent with standard APPLE][operation. Flash mode is not available.

TOGGLE OVERSTRIKE MODE allows characters to non-destructively print on top of others. This permits underlining, making up special characters like theta and slashed zero, and also overlaying graphics already on the screen.

TOGGLE HI-RES PAGE simply switches the display and write function from page one to page two and back. It is possible to display one page while writing on the other by switching the display page directly with a PEEK(-16300 or -16299) as explained in the APPLE][manuals. SOFT SEVENTY's writing page is unaffected by this command. A toggle with ESC-P will always leave the display page the same as the write page.

QUIT (ESC-Q) is normally used only from the keyboard. This reverts to the standard text screen (page one) and jumps to the address held in the APPLE][DOS Warm Start vector ($3D0:3D1). Normally this points to the language warm start location $E0 via detour through DOS. Thus, if executed within a program, this command stops execution. This does not clobber the current BASIC program. Do not use ESC-Q if DOS is not resident; use CALL 38173 (-27363) instead.

To switch to the normal 40 column screen within a program, CALL 38173 (-27363).

To restart SOFT SEVENTY, CALL 38144 or CALL 38147 (-27392 or -27389). CALL 38144 initializes SOFT SEVENTY and clears the display screen. CALL 38147 returns to SOFT SEVENTY without clearing the screen. (BRUNning SOFT SEVENTY does an implicit CALL 38144.) Pressing RESET (assuming the Autostart ROM) executes a CALL 38147, allowing for quick re-entry to SOFT SEVENTY, without clearing the screen. (This feature is not available on SOFT SEVENTY $800). If this feature is undesirable, change the vector SOFTEV ($3F2:BF 9D) and CALL -1169 after booting SOFT SEVENTY.

INTEGER CHR$ FUNCTION. Another feature of SOFT SEVENTY is an emulation of Applesoft's CHR$ function for use with the Integer Basic language, which has no such function. To operate, simply POKE 71 with the ASCII equivalent of the character desired (with or without high bit set — this bit is ignored) and CALL 38156 (-27380). Here's an example, which will print a control-G (That is, this will sound the bell):

```
10 CHR$ = 71:REM MAKES IT EASY TO REMEMBER
.....
.....
500 POKE CHR$,7:REM CTRL-G
510 CALL -27380:REM $950C
```

SCREENREAD FUNCTION. Still another feature of SOFT SEVENTY is the SCREENREAD function. SCREENREAD (CALL 38150 or -27386) allows a program to determine what character is present on the screen at a given location. This function POKEs the ASCII code of the character at the cursor location into location 71 ($47). If the character is not in the current font, SCREENREAD returns with the value 160 ($A0 — space character). SCREENREAD will read either font, but only the font presently in use. Example: the following Applesoft program will print the ASCII code of the character at line LN, column COL:

```
10 VTAB LN:POKE 9,COL-1:REM ESTABLISH DESIRED
CURSOR POSTION
20 CALL -27386:REM CALL SCREENREAD
30 VTAB 10 :REM MOVE DOWN TO PRINT
40 PRINT PEEK (71):REM PRINT ASCII CODE
```

SETTING THE TEXT WINDOW is done almost as with the normal APPLE][convention. Top and bottom are set as normal. The left margin of the screen is set in 40 column format (not 70!) by POKE 32,X where X is between 0 and 39. Since we are interested in columns, make X = N/70*40, where N is the actual left margin required.

Window width is set with POKE 38171,X (POKE -27365,X) where X is between 0 and 70. However, be careful not to write beyond the screen by setting a left margin and a wide window. To be safe, do not set window width more than 70-L*70/40, less one or two for safety, where L is the left margin in 40 character format, and is also the contents of location 32 ($20).

Whenever window width is changed, a warm start (CALL 38147 or -27389) must be executed or strange *(and probably undesired)* results will occur. A Cold Start (CALL 38144 or -27392) sets left margin at 0 and window width at 70. A Warm Start (CALL 38147 or -27389) leaves margins as they are. The width is whatever it was when SOFT SEVENTY was last connected. Remember that left margin plus width must not be greater than 70. Top and bottom of the text window are reset to full screen by Cold Start, but are not affected by Warm Start.

A QUIT (ESC-Q) command resets the text screen to its normal APPLE][full-screen, 40-character default.

EXECUTING SPECIAL FUNCTIONS from within a program is accomplished by printing a control-A X, where X is a letter between A and Q, as with the ESC-X commands used from the keyboard.

Here is an example of inverting the screen from within an Applesoft program:

```
100 PRINT CHR$(1)"H"
```

From Integer Basic, use the special CHR$ emulation:

```
10 CHR$ = 71:REM OPTIONAL PREDEFINITION
.....
.....
100 POKE CHR$,1
110 CALL -27380
120 PRINT "H"
```

Of course, it is also possible to simply PRINT [A]H, where the [A] is a typed-in control-A. This is not recommended. The control-A cannot be seen in listings, and will not be copied by the right-arrow function. Further, when listing, SOFT SEVENTY will react to the control sequences by executing the special function indicated.

If for any reason it is desirable to use a different flag character than control-A, then change location $9518 to the ASCII equivalent of the desired flag character (high bit set).

Horizontal Tabbing, HOME, and Graphics.

Because of the way the BASIC languages handle horizontal tabbing, some strange results occur from the use of HTABs, TABs, commas in PRINT statements, etc. in 70 column mode. Some of these functions don't work at all; others work only to 40 columns. Simply spacing over (PRINT " ") always works, as does PRINT SPC (N) in Applesoft. A sure way to print to a certain column is POKE 9,COL-1 where COL is the desired column number (0-70). A more detailed discussion of unusual behavior by screen control commands is given in Appendix I.

Program listings will display to a full 70 columns, but non-parsed wrap-around will occur on statements over 70 columns long (You may find this easier for correcting PRINT statements, anyway.)

HOME does not function, nor does CALL -936; substitute CALL 38153 or -27383 instead. HOME and CALL -936 will not clear the screen, but move the cursor to somewhere on the top line of the screen.

LO-RES GRAPHICS are not visible, since the Hi-Res screen is displayed by SOFT SEVENTY.

HI-RES GRAPHICS. Since SOFT SEVENTY is really just a Hi-Res graphics driver, it is possible to draw on the Hi-Res screen under program control while using SOFT SEVENTY. This allows mixing of graphics and text on the Hi-Res screens at will. This feature is useful for labeling graphs, charts, and pictures. SOFT SEVENTY's OVERSTRIKE mode can be used to good advantage while labeling.

V. MEMORY USAGE

SOFT SEVENTY occupies the $9500-9CFF space. In addition, a few zero page words are used. These are:

$09 $47 $EC $ED $EE $EF $FA $FB

Further, many zero page words used by Monitor routines are used in accordance with their normal I/O functions.

Byte $47 is used only by the Integer CHR$ emulation and the SCREENREAD function. Byte $09 is the horizontal cursor location, and must be in the range 0-69. This can be externally set by programs, if desired. Bytes $EC-$EF, and $FA-$FB are used as scratch and may be used by other programs without affecting the operation of SOFT SEVENTY. However, these locations will be altered whenever SOFT SEVENTY is called.

Some key internal variables are:

TABL	$9516 Pointer to Font in use (low)
TABH	$9517 Pointer to Font in use (high)
CONTCHAR	$9518 Control Flag Character
PAGE	$9519 Hi-Res Page in use ($20 or $40)
WNDWIDTH	$951B Screen width in Columns (0-70)

Situations may arise in which the location of SOFT SEVENTY is inappropriate for a certain application. For example, it may be desired to use SOFT SEVENTY with other programs which reside in the space above the DOS buffers. A relocated version of SOFT SEVENTY is provided to take care of these situations. This version, SOFT SEVENTY $800, locates itself and runs in the region $800-FFF.

VI. ALTERNATE SOFT SEVENTY LOCATION

Use of SOFT SEVENTY $800 is identical to the regular SOFT SEVENTY, except that the entry points are different. Use the following entry points:

1. CALL 2048 Initialize (Cold Start) and clear screen
2. CALL 2051 Warm Start SOFT SEVENTY
3. CALL 2054 SCREENREAD function
4. CALL 2057 HOME function
5. CALL 2060 Integer CHR$ function
6. CALL 2077 UNLINK - disconnects SOFT SEVENTY

SOFT SEVENTY $800 must be protected from overlay by BASIC programs being loaded or run. In Integer, this is a simple matter — just set LOMEM: 4096 before running the BASIC program. Alternatively, the following statements at the beginning of an Integer program will initialize and protect SOFT SEVENTY. These statements must precede definition of any variables in the program.

```
1 POKE 74,0:POKE 75,16:POKE 204,0:POKE 205,16:REM SETS
LOMEM: AND VARIABLE POINTER TO 4096
2 PRINT "[d]BRUN SOFT SEVENTY $800" :REM THE [d] IS A
CTRL-D
```

From Applesoft, run the FPSS program before running a program which will use SOFT SEVENTY $800. Alternatively, from within a program, use the &LOMEM: utility supplied, as follows:

```
1 PRINT CHR$(4)"BRUN LOMEM:" : & LOMEM:4096
2 PRINT CHR$(4)"BRUN SOFT SEVENTY $800"
```

Use of SOFT SEVENTY $800 with Integer Basic allows $1000 bytes for Integer variables before the variable space collides with the first Hi-Res screen at $2000. If this is not adequate, try setting LOMEM above the Hi-Res screens. (LOMEM: 24576 or POKE 74 and 204,0; POKE 75 and 205,96.)

Should more space be needed for variables, etc., it is possible to use the second Hi-Res screen. (LOMEM:16384 or POKE 74 and 204,0 and POKE 75 and 205,64.) Of course, writing to Hi-Res page two in this case will spell disaster.

VII. APPLESOFT USAGE

Applesoft programs tend to use low memory more heavily than do Integer progams, so the space between $1000 and $2000 may not be adequate. In this case, use the & LOMEM: utility to move the program above the Hi-Res screens to 24576 ($6000) or to 16384 ($4000) if Hi-Res page two is not required.

VIII. TECHNICAL NOTES:

1. SWITCHING LANGUAGES: Switching between languages with SOFT SEVENTY is not a problem. Use the FP or INT commands. With SOFT SEVENTY $800, however, there are some technicalities to be concerned with. It is simple to switch from Applesoft to Integer Basic from within SOFT SEVENTY $800. Just issue an INT command, then LOMEM:4096 (or higher). It doesn't work the other way around, however, because an FP command writes into the addresses $800-803 and will cause the system to hang. To switch from Integer Basic to Applesoft, first leave SOFT SEVENTY $800 (ESC-Q), then RUN FPSS.

2. USING FPSS: The FPSS program, less its NEW statement, should be at the first of any Applesoft program which uses SOFT SEVENTY $800 to be sure SOFT SEVENTY $800 is protected from overwrite. However, once FPSS has been run, it need not be run again until the FP command is issued (from the keyboard, or from disk boot, etc.). If FPSS is used as a HELLO program, the disk will auto-boot to SOFT SEVENTY $800. It is a good idea to type FP before running FPSS if there is any chance that the Applesoft LOMEM: has been set above 4096. This is because the &LOMEM: utility which FPSS uses will move an Applesoft program up, but not down, in memory. Running FPSS with LOMEM: already above 4096 will produce an error message or cause the system to hang.

3. USE OF SOFT SEVENTY WITHOUT DOS: SOFT SEVENTY works fine without DOS connected. When SOFT SEVENTY links itself to the Monitor I/O vectors, it checks for the presence of DOS. If DOS was connected before SOFT SEVENTY links, then DOS is connected after SOFT SEVENTY links. If DOS was not already connected, then SOFT SEVENTY does not connect it. (Don't use ESC-Q without DOS resident. This command causes a jump to the address pointed at by SOFTEV. When DOS boots, it sets SOFTEV to point at a reconnect routine.)

4. HI-RES PAGE SELECTION: SOFT SEVENTY linking routines (Cold and Warm Start) do not change the Hi-Res page. SOFT SEVENTY will go to whichever page is called for by the PAGE byte ($9519, which contains $20 or $40). When SOFT SEVENTY is BRUN, page one is selected, because the PAGE byte is set at $20 as supplied. To change the default to page two:

```
BLOAD SOFT SEVENTY
CALL -151
919:40
BSAVE SOFT SEVENTY,A$800,L$900
```

(for SOFT SEVENTY $800, simply BSAVE a version of SOFT SEVENTY $800 with $819:40.)

To repeat, if SOFT SEVENTY is disconnected while on page two, any of the link calls will return to that page. If that's unacceptable, simply POKE 38169 (-27367) to 32 for page one or to 64 for page two, before linking via Cold or Warm Start. Interesting, but probably undesirable results will occur if location 38169 contains anything but 32 or 64 decimal.

SOFT SEVENTY will operate on the Hi-Res page specified by location 38169 whether this page is being displayed or not. This makes it possible to clear or fill one screen while displaying the other, by POKEing location 38169. The ESC-P (or control-A-P) command will always leave the display page the same as the write page. Applesoft commands HGR and HGR2 will set the display page and set Applesoft graphic's write page, but will not change SOFT SEVENTY's write page. It is up to the user to keep the pages synchronized or not, as desired. This allows maximum flexibility in SOFT SEVENTY usage.

APPENDIX I

BASIC SCREEN CONTROL COMMAND BEHAVIOR

COMMAND	BEHAVIOR WITH SOFT SEVENTY	SOFT SEVENTY ALTERNATIVE
NORMAL	usual	ESC-N
INVERSE	usual	ESC-N
FLASH	yields garbage displays	none
HOME, CALL -936	sets cursor to top of window (somewhere)	CALL 38153 (-27383)
VTAB	usual	
HTAB (INTEGER TAB)	normal to 40 columns only	POKE 9,Col-1
TAB	not reliable	POKE 9,Col-1
POS	not functional	X = PEEK(9)
SCRN	not functional	use SCREENREAD
SPC	usual	
SPEED	usual	
TEXT	switches display, but not write field	CALL 38173 (-27383)
Lo-Res PLOTTING	not visible	
Hi-Res PLOTTING	fully functional	
left arrow (Backspace)	usual	
right arrow (Fwdspace)	usual	

APPENDIX II

SOFT SEVENTY FONT CONFIGURATION

SOFT SEVENTY contains two different fonts, designated "regular font" and "graphics font," in the region $9A00-9CFF (SOFT SEVENTY $800's character set is in the region $D00-FFF). The configuration is typical of that used by common Hi-Res character generators, such as ANIMATRIX in the DOS Tool Kit from APPLE Computer, Inc., or HIGHER TEXT from your SOFT SEVENTY supplier.

Each Hi-Res character requires eight bytes in the font. The first byte is the bit configuration of the top row of the character, the second byte represents the second row, and so on. In the stored font, the eight bytes for each character are stored consecutively, as illustrated:

SOFT SEVENTY Hex Addr	Load Addr*	S70 $800 Hex Addr	Hex Char	ASCII Char
$9A00-9A07	$E00-E07	$D00-D07	A0	(SPACE)
$9A08-9A0F	$E08-E0F	$D08-D0F	A1	!
$9A10-9A17	$E10-E17	$D10-D18	A2	"
.....	....	.....	..	.
$9B00-9B07	$F00-F07	$E00-E07	B0	@
$9B08-9B0F	$F08-F0F	$E08-E0F	B1	A
$9B10-9B17	$F10-F17	$E10-E17	B2	B
.....	....	.....	..	.
$9C08-9C0F	$1008-100F	$F08-F0F	C1	a
$9C10-9C17	$1010-1017	$F10-F17	C2	b
.....	....	.....	..	.
$9CF8-9CFF	$10F8-10FF	$FF8-FFF	FF	(INV BLOCK)

Because the SOFT SEVENTY character is only four dots wide, only four bits are required to represent each row of the character. Thus, two different fonts can share same font area. The regular font uses bits 0-3 of each byte, and the graphics font uses bits 4-7 of each byte. This is illustrated below for the "A" character and its graphics counterpart.

Hex Byte	Contents (Hex)	Bit No. 0	1	2	3	4	5	6	7
$9B08	F4	.	.	X	.	X	X	X	X
$9B09	0A	.	X	.	X	.	.	.	.
$9B0A	FA	.	X	.	X	X	X	X	X
$9B0B	0A	.	X	.	X	.	.	.	.
$9B0C	FE	.	X	X	X	X	X	X	X
$9B0D	0A	.	X	.	X	.	.	.	.
$9B0E	FA	.	X	.	X	X	X	X	X
$9B0F	00	.	.	.	.	.	.	.	.

The APPLE][Hi-Res screen uses the seventh bit as a half-shift designator. SOFT SEVENTY always displays the bottom row (only) half-shifted. The descenders look best this way. This half-shift must be kept in mind when designing graphics characters. If fonts are designed or edited using HIGHER TEXT or similar utilities, RUN the FONT MERGE program to convert them to SOFT SEVENTY format.

*Note — SOFT SEVENTY first loads at $800, then relocates to $9500 during the initialization process. The font's load address is shown so that changes can be easily made. (Then BSAVE SOFT SEVENTY, A$800,L$900.)

APPENDIX III

SUMMARY OF SPECIAL ADDRESSES

	SOFT SEVENTY CALLS		SOFT SEVENTY $800 CALLS		FUNCTIONS PERFORMED
ENTRY POINTS:					
Cold Start	38144	-27392 $9500	2048	$800	Initializes, calls SOFT SEVENTY, sets 70 columns, clears screen
Warm Start	38147	-27389 $9503	2051	$803	Returns to SOFT SEVENTY without clearing screen
SCREENREAD	38150	-27386 $9506	2054	$806	POKEs 71 ($47) with ASCII code for character at cursor position
HOME	38153	-27383 $9509	2057	$809	Clears Screen
INTEGER CHR$	38156	-27380 $950C	2060	$80C	Prints Character whose ASCII code is in ($47) at cursor position
UNLINK	38173	-27363 $951D	2077	$81D	Disconnects SOFT SEVENTY, returns to 40 column text screen page 1
OTHER LOCATIONS:					
CH	9	9 $9	9	$9	Horizontal cursor position (0-69)
Font Pointer	38166	-27370 $9516	2070	$816	Address of font in use (low byte)
Font Pointer	38167	-27369 $9517	2071	$817	Address of font in use (high byte)
Control Flag	38168	-27368 $9518	2072	$818	Alerts Soft Seventy special function key coming next, normally ctrl-a ($81)
Page	38169	-27367 $9519	2073	$819	Directs screen write to proper Hi-Res screen ($20 or $40)
Window Width	38171	-27365 $951B	2075	$81B	Number of columns per line (0-70)

APPENDIX IV

SOFT SEVENTY DISK CATALOG AND EXPLANATIONS

HELLO SEVENTY	Applesoft HELLO program which allows optional automatic loading of SOFT SEVENTY
SOFT SEVENTY	The 70 column utility itself, which loads at $800-10FF, then relocates its top $800 words to run at $9500-9CFF
SOFT SEVENTY $800	A relocated version of SOFT SEVENTY, which loads and runs at $800-FFF
LOMEM:	Utility for moving Applesoft programs to provide room for and protect SOFT SEVENTY $800
FPSS	Utility which sets an Applesoft LOMEM and BRUNS SOFT SEVENTY $800. When using SOFT SEVENTY $800 (only), this program should be run anytime an FP command or disk boot has occurred. Applesoft programs using SOFT SEVENTY $800 can accomplish this automatically by starting with this utility (minus the NEW statement)
PRINT CHARACTER SET	Utility which displays both fonts with their associated ASCII codes
APPLESOFT DEMO	Applesoft demonstration program. SOFT SEVENTY must be resident to run this program
INTEGER DEMO	Integer Basic demo program. SOFT SEVENTY must be resident to run this program
PLOT DEMO	Demonstration of the overlay of Hi-Res graphics on SOFT SEVENTY text
FONT MERGE	Utility for merging two fonts into the format needed for SOFT SEVENTY. This utility is capable of creating font sets only, or creating SOFT SEVENTY systems with user created fonts
FONT MERGE.B	Machine language subroutine used by FONT MERGE
ASCII.FONT	First of two standard format single fonts
GRAPHICS. FONT	Second of the two standard format single fonts
SYSTEM. FONT	Combined font, in SOFT SEVENTY format. This is the character set supplied with SOFT SEVENTY which contains each of the two above fonts
LEDGER SHEET CHART	Hi-Res images of SOFT SEVENTY displays, used by the Demo programs
APPLESOFT	Integer Basic version of the HELLO program. This automatically runs upon disk boot if Applesoft language is not available which allows for automatic loading of SOFT SEVENTY

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